17. 05. 2004

Patents Office
Government Buildings
Hebron Road
Kilkenny

I HEREBY CERTIFY that annexed hereto is a true copy of documents filed in connection with the following patent application:

Application No.	S2003/0303
Date of Filing	22 April 2003
Applicant	PATRICK LEAHY, an Irish citizen of 14 Hume Street, Dublin 2.

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

Dated this 21 day of April 2004.

An officer authorised by the
Controller of Patents, Designs and Trademarks.

S030305

Application No.

FORM NO. 1

REQUEST FOR THE GRANT OF A PATENT
PATENTS ACT, 1992

The Applicant named herein hereby request

~ the grant of a patent under Part II of the Act

X the grant of a short-term patent under Part III of the Act

on the basis of the information furnished hereunder.

1. **APPLICANT**

Name	**Patrick Leahy**
Address	**14 Hume Street, Dublin 2.**
Description/Nationality	**Irish**

2. **TITLE OF INVENTION**

"Surgical Repair Device"

3. **DECLARATION OF PRIORITY ON BASIS OF PREVIOUSLY FILED APPLICATION FOR SAME INVENTION (SECTIONS 25 & 26)**

Previous filing date	Country in or for which filed	Filing No.
~		

4. **IDENTIFICATION OF INVENTOR(S)**

Name(s) of person(s) believed by Applicant(s) to be the inventor(s)

1. Patrick Leahy
2. ~

Address

1. 14 Hume Street, Dublin 2.
2. ~

5. **STATEMENT OF RIGHT TO BE GRANTED A PATENT (SECTION 17(2)(B))**

By virtue of the Applicant being the Inventor.

Contd./...

S63303

6. **ITEMS ACCOMPANYING THIS REQUEST - TICK AS APPROPRIATE**

(i)	X	prescribed filing fee (€60.00)
(ii)	~	specification containing a description and claims
	X	specification containing a description only
	X	Drawings referred to in description or claims
(iii)	~	An abstract
(iv)	~	Copy of previous application(s) whose priority is claimed
(v)	~	Translation of previous application whose priority is claimed
(vi)	~	Authorisation of Agent (this may be given at 8 below if this Request is signed by the Applicant(s))

7. **DIVISIONAL APPLICATION**
The following information is applicable to the present application which is made under Section 24 -

Earlier Application No: ~
Filing Date: ~

8. **AGENT**

The following is authorised to act as agent in all proceedings connected with the obtaining of a Patent to which this request relates and in relation to any patent granted -

F. R. KELLY & CO. at their address as recorded for the time being in the Register of Patent Agents

9. **ADDRESS FOR SERVICE (IF DIFFERENT FROM THAT AT 8)**

Patrick Leahy
F. R. KELLY & CO.

By: _____
EXECUTIVE

Date: April 22, 2003

A Surgical Repair Device

The present invention relates to a surgical repair device and, in particular, to a device for the repair of hernias, such as inguinal, groin and abdominal wall hernias.

According to the invention there is provided a surgical repair device comprising an outer tubular housing, an inner shaft extending through the housing and an umbrella type mesh arrangement provided adjacent the front end of the inner shaft, the mesh arrangement comprising a mesh mounted to flexible members and movable between a first folded configuration wherein the mesh is folded rearwards towards the inner shaft and the flexible members extend substantially along the inner shaft and a second open configuration wherein the mesh extends substantially transversely to the inner shaft and the flexible members extend outwardly from the shaft, the mesh being adapted to move between said first and second configurations when the shaft is drawn rearwardly relative to the housing.

Preferably, a central region of the mesh is secured to the front end of the inner shaft and a peripheral edge of the mesh is connected to the flexible members, the latter being connected to a band through which the inner shaft slides.

Preferably, the inner shaft projects from the front end of the housing and the mesh arrangement is located on the projecting portion of the inner shaft.

Preferably, a tubular collar is located adjacent the front end of the housing and a trigger is slideably mounted on the housing and connected to the collar such that when the trigger is slid rearwardly, the collar is retracted within the housing.

Preferably, the collar overlies the mesh arrangement in the non-retracted position and the mesh arrangement is exposed when the collar is in the retracted position.

Preferably, an inflatable balloon is wrapped around the housing adjacent the front end thereof and is connectable to fluid supply means for inflating the balloon. Preferably, the outer tubular housing and the inner shaft each comprise a handle at the rear end thereof.

Preferably, the inner shaft is adapted to be cut so that the mesh arrangement and a portion of the inner shaft may be separated from the device.

Preferably, such cut end of the shaft is adapted to be located in a depression formed in a rivet head. Preferably, the mesh arrangement and/or rivet head are made from biodegradable plastic.

The invention will now be described further, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a surgical repair device of the invention in the un-deployed configuration;

Fig. 2 is a perspective view of the surgical device of figure 1 with the collar retracted;

Fig. 3 is a perspective view of the surgical device of figure 1 with the mesh being opened; and

Fig. 4 is a rear perspective view of a rivet head for use with the surgical device of figure 1.

Referring to figure 1, a surgical repair device 1 of the invention comprises an outer tubular housing 2 having a handle 4 at the rear end thereof. A tubular collar 6 is located adjacent the front end of the housing. A trigger 8 is slideably mounted on the outer housing and is connected to the collar 6 through slot 10 formed in the outer housing. When the trigger 8 is slid rearwardly towards the handle 4, the collar 6 is retracted within the housing 2.

An inflatable balloon 12 is wrapped around the housing 2 adjacent the front end thereof and is connected by a tube 14 to a pump or other fluid supply means for inflating the balloon. The tube 14 is secured at discrete locations 16 to the outer housing 2 and handle 4. In use, the balloon 12 may be inflated by air, CO_2 or any other suitable gas.

Referring to figures 2 and 3, an inner shaft 18 having a handle 20 at the rear end thereof is located within the housing 2. The inner shaft 18 slides within the outer housing 2 as the handle 20 is drawn rearwardly away from the handle 4.

An umbrella type mesh arrangement is provide adjacent the front end of the inner shaft 18. The central region of a substantially circular mesh 22 is secured to the front end of the inner shaft 18 and the peripheral edge of the mesh is connected by flexible members 24 to a band 26 through which the inner shaft slides.

In the un-deployed configuration, as shown in figure 1, the handle 20 lies just behind the handle 4 and the inner shaft 18 extends through the outer housing 2. The inner shaft is longer than the housing so that it projects from the front end of the housing. The mesh arrangement is located on the projecting portion of the inner shaft and the collar 6 covers the mesh arrangement in the un-deployed configuration. The forward end of the inner shaft defines the tip of the device.

In use, the trigger 8 is slid rearwardly towards the handle 4 to retract the collar 6 and expose the un-deployed mesh arrangement, as shown in figure 2. In the un-deployed configuration, the mesh 22 is folded rearwards towards the inner shaft and the flexible members extend along the inner shaft.

The handle 20 is then drawn away from handle 4 so that the inner shaft 18 slides rearwardly within the housing and relative to band 26. The flexible members 24 flex outwardly, as shown in figure 3, and the mesh 22 opens out to the deployed configuration wherein it extends substantially transversely to the inner shaft.

Referring to figure 4, a rivet head 28 for use with the mesh arrangement of the surgical device of the invention, comprises a disk having a conical front surface and a rear surface with a depression 30 formed centrally therein. In use, the rivet head 28 is secured against a cut end of the inner shaft 18 of the surgical device by seating the cut end of the shaft in the depression 30, as described below.

In performing surgery, a small incision is made, for example in the patients abdomen, at or adjacent the site of the hernia, the incision preferably not passing through the peritoneum. The front end of the surgical repair device 1, in the un-deployed configuration shown in figure 1, is inserted into the incision, such that the tip thereof is located against the hernia, with the peritoneum being disposed between the tip of the repair device and the hernia.

The balloon 12 is then inflated via tube 14 to create a cavity into which a fibre optic camera or the like can be inserted in order to aid in the surgical procedure.

While holding the device by handle 4, the trigger 8 is slid rearwardly towards the pair of handles 4, 20, thereby retracting the collar 6 so exposing the mesh arrangement, as shown in figure 2

Referring to figure 3 the handle 20 is drawn away from handle 4 so that the inner shaft 18 slides rearwardly within the housing, thereby forcing the mesh 22 to open. At this point, the mesh 22 is pressed against the

protruding hernia, through the peritoneum, in order to force the hernia back into position.

The inner shaft 18 is then cut or removed from the handle 20 and the remainder of the device 1 is removed, leaving only the mesh arrangement pressed against the hernia, with the inner shaft protruding therefrom. The inner shaft is then cut to a length of about 1 to 2 cm.

Subsequently, the rivet head 28 is secured against the cut end of the inner shaft 18 by seating the cut end of the shaft in the depression 30 formed in the rivet head. The rivet head is therefore located beneath the patient's skin and the surgical incision is closed so that the rivet head is held in place and consequently the mesh 22 is held in place against the hernia.

Typically, the inner shaft handle 20 is smaller than the outer housing handle 4 and the handles are generally T-shaped for convenient and secure gripping in use.

Both the mesh and the rivet head may be formed from any suitable material, preferably plastic, and may, for example, be formed of a biodegradable plastic. Typically, the mesh and rivet head would not be subsequently removed from the patient's body.

It will be appreciated that the present invention is not intended to be restricted to the details of the above embodiment, which is described by way of example only.

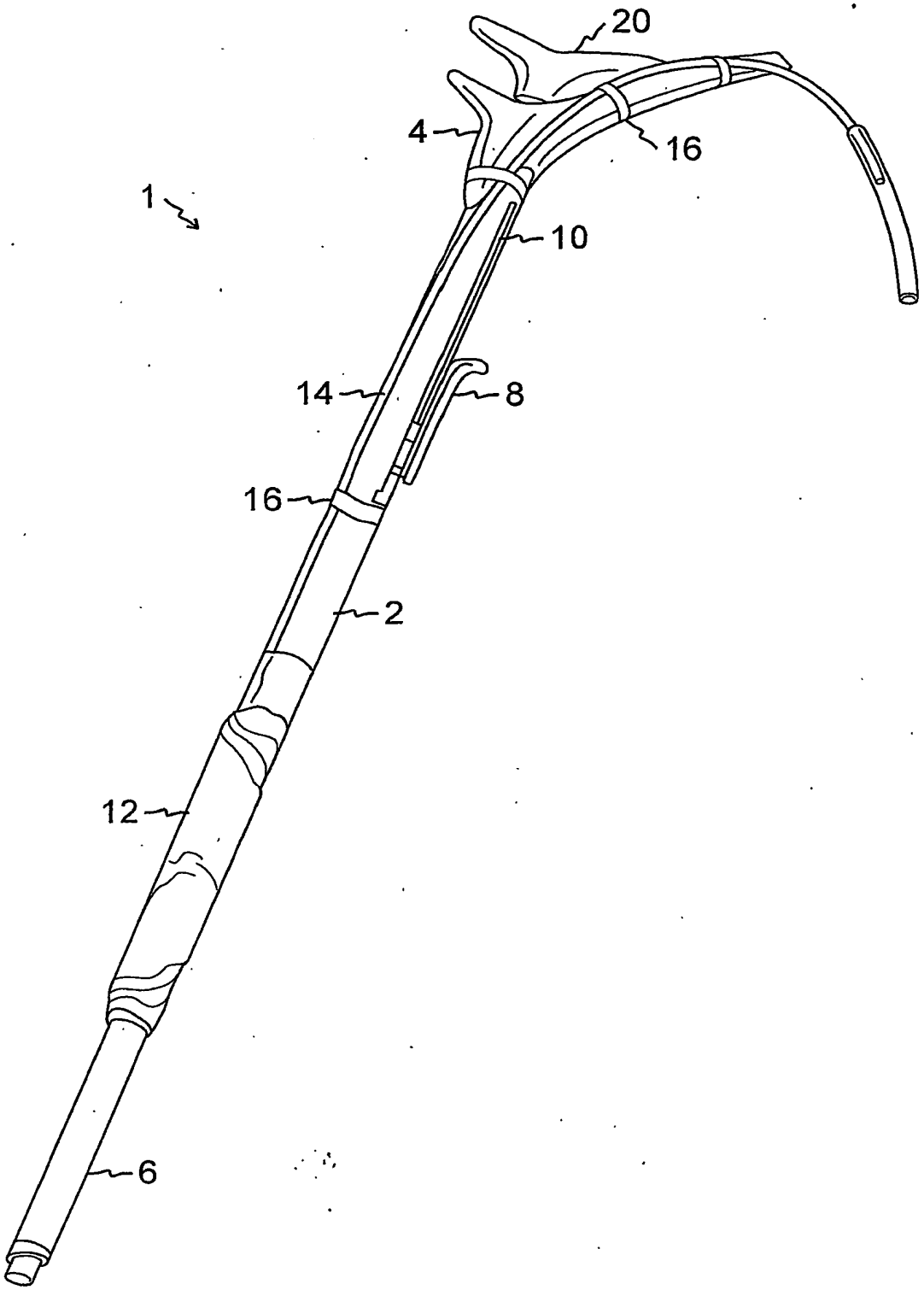

Fig. 1

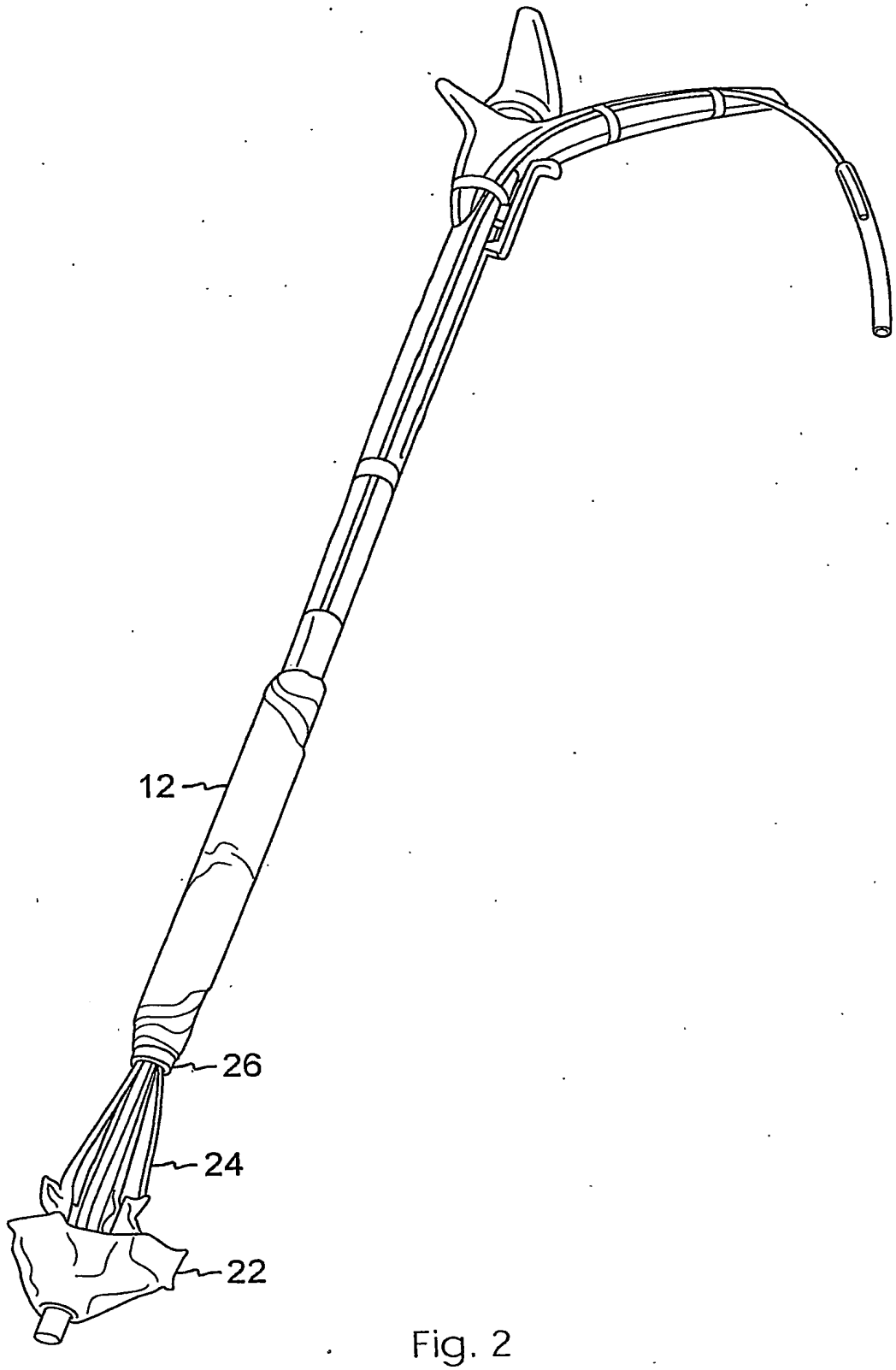

Fig. 2

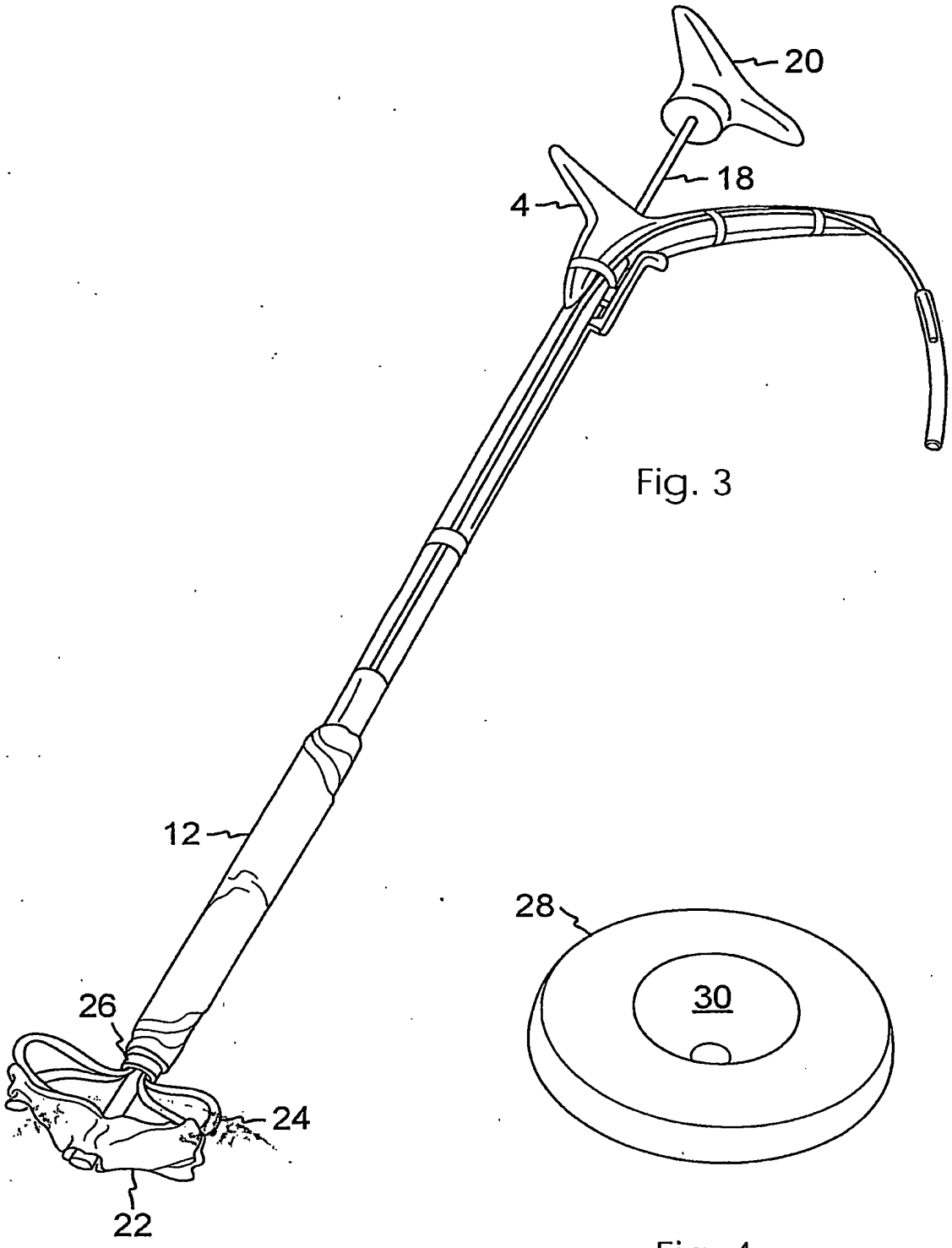

Fig. 3

Fig. 4